

Morse Code

Connection to BSA STEM Awards

This is a fun STEM activity that can be used as part of the *Nova Tech Talk* Requirement 3 (the watch and/or read requirement) and *Nova Tech Talk* Requirement 2A (describe how technology is used in the field of communication). The construction of the simple working electrical circuit (the one with the battery, light, and switch) meets Requirement 6 of the *Webelos Engineer Activity Badge*.

Content Notes

- The basic idea here is to create a technology “station” where kids come to learn about early communications technology, specifically Morse code. The station has activities that are suitable for the full range of Cub Scout ages.
- The *Silent Simon Says Game* is designed for first graders and above as a first introduction to the idea of signaling without talking.
- The *Morse Code Decoding* activity is for first graders and above as a first try at decoding words given in Morse Code.
- The *Build a Morse Code Signaler* activity comes in two different versions, one for first-third graders (without a switch) and one for fourth-fifth graders (with a switch). The intention is for kids to do one or the other, but not both building activities.
- The *Send a Secret Message Using Morse Code* activity provides an opportunity for kids to use the electrical circuit they just built.
- **Optional:** The Morse Code poster elements file contains titles, graphics, visuals, and an encoder and decoder to illustrate Morse Code and a bit of its history.

Get Ready

- For the *Silent Simon Says Game*, you will need for each child:
 - a small flashlight that easily toggles on and off; inexpensive flashlights can be obtained from Oriental Trading Company. (As of January 2013, we are purchasing the 3-in-1 whistle, toy compass, and light key chains at 12 for \$5.25.)
 - a copy of the *Silent Simon Says Decoder* page
- For the *Morse Code Decoding* activity, you will need for each child:
 - The *Morse Code Decoding* activity page
 - The *Morse Code Decoder* page (best to print the *Morse Code Encoder* on the back)
 - Pencils
 - Possibly clipboards
- For the *Build a Morse Code Signaler* activity, you will need:
 - Tools: small pliers, pins, wire stripper, hole punch, scissors, black and red pens, permanent marker
 - For the first through third graders: a plastic baggy with the following supplies
 - 1 3-volt mini LED light bulb (such as Linrose Model B4303F1, at Fry’s, 1-pack \$0.49, 10-pack \$2.99, 25-pack \$6.69)
 - **Small** cardboard square (about 2” x 2”) with a hole punched in the middle, a standard hole punch will do
 - 2 AA batteries
 - 1 battery holder (such as Philmore Model BH320; which has lead wire terminals, at Fry’s, 1-pack \$1.29)
 - For the fourth and fifth graders: a plastic baggy with the following supplies
 - 1 3-volt mini LED light bulb (such as Linrose Model B4303F1, at Fry’s, 1-pack \$0.49, 10-pack \$2.99, 25-pack \$6.69)
 - **Medium** cardboard square (about 6” x 6”) with a hole punched near the middle of the top edge, a standard hole punch will do
 - 2 AA batteries
 - 1 battery holder (such as Philmore Model BH320; which has lead wire terminals, at Fry’s, 1-pack \$1.29)

- 1 small metal paperclip
 - 1 6-inch piece of 22-gauge solid electrical wire, stripped on both ends (such as RadioShack Model 278-1221, 90 ft, \$8.49, enough for 180 kits)
 - electrical tape
- *Build a Morse Signaler* directions page, one copy of the appropriate model for each child (there is one version for the first-third graders and one version for the fourth-fifth graders).
- **Warning:** It is *not* easy to pull these supplies together at the last minute. Many electronics suppliers, like RadioShack and Fry's, do not carry large quantities of the necessary supplies. If you are expecting a very large group, you will need to prepare well in advance to allow time for possibly ordering by mail.
- For the *Send a Secret Message Using Morse Code* activity, you will need for each child:
 - A simple circuit with a switch and a light, preferably one that the child just made, but this could easily be done with pre-made circuits.
 - A copy of the *Send a Secret Message Use Morse Code* activity page.
 - A copy of the *Morse Code Encoder* page.
 - Pencils
 - Possibly clipboards
- **Optional:** make the *Morse Code* poster or have the kids make the poster.
- **Highly Recommended:** do the activities yourself before having the children do them. This helps you identify problem areas, safety issues, and best strategies for directing the activity.

Get Set

- If you have it, set up your poster near your station.
- Set up the activities you plan to do at this station. The activities at this station are meant to be done in the sequence presented above. Ideally, you'll want four substations at this station, one for each activity.
 - *Silent Simon Says* can be done outside and only requires doling out flashlights and decoders.
 - The *Morse Code Decoding* activity can be done at tables, desks, or outside with clipboards.
 - The *Build a Morse Code Signaler* activity really needs to be done at tables or desks.
 - The *Send a Secret Message* activity can be done at tables, desks, or outside with clipboards.
- Make sure that you have one adult leader or parent to staff each of the four activities. An adult leader or parent can be given a 5-minute orientation to the activity he/she will direct, including what to expect and how to begin.

Go!

- Each child who comes to this station should be directed to partner up with another child.
 - To start *Silent Simon Says*, an adult leader can explain that the game is like *Simon Says*, but it's silent and uses flashlight signals to communicate. An adult leader should be Simon for a couple of minutes to give kids the idea and then they can pair off to play with each other. Make sure each child has a decoder page. There is actually no need at this point to mention Morse code!
 - The *Morse Code Decoding* activity needs very little explanation, but an adult leader could connect it to the *Silent Simon Says* game by pointing out that the Morse signals for S, T, A, K, and R are the same as the flashlight pattern for those commands in the game.
 - The *Build a Morse Code Signaler* activity will work best if the kits for each child are as complete as possible, with wires pre-stripped, electrical tape pre-cut and parked on a piece of wax paper, and the cardboard cut and hole-punched. Have plenty of back-up parts for those kids who promptly lose things. Have kids write their names on their kit baggy. (Use a large enough baggy that the completed circuit can be put back in the baggy for the trip home.)
- The kids should be engaged in hands-on action the vast majority of the time during these activities. These are not intended to be demonstrations by adults with kids watching. The intention is "learning by doing". The adult leaders should only be doing a part of the activity if there is a safety issue or perhaps to briefly demonstrate.
- Make sure the children write their names on their activity sheets when they first get them.
- Ideally, the kids should help with the clean-up and re-setting of the station for the next group.